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WELLS ST. JOHN P.S.
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SPOKANE, WA 99201

EXAMINER

TUROC, DAVID P

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 10/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/666,025

Applicant(s)

BASCERI ET AL.

Examiner

David Turocy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS; WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 August 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 41, 42, 47 and 54 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-11, 41, 42 and 54 is/are rejected.
- 7) ☒ Claim(s) 47 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The applicant's amendments, filed 8/11/2005, have been fully considered and reviewed by the examiner. The examiner notes the amendments to claims 1 and 5. Therefore the examiner has withdrawn the 35 USC 103(a) rejections to the claims because the prior art of record does not teach the added claim limitations. The examiner notes the cancellation of claims 43-46 and 48-53, the amendments to claims 41-42 and 47 to correct dependencies, and the addition of the new claim 54. Claims 1-11, 41-42, 47, and 54 remain pending.

Double Patenting

2. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claim 47 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 5. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 10 are rejected under 35 U.S.C. 102(a) as being anticipated by US Patent 6245674 by Sandhu, hereafter Sandhu.

Sandhu teaches a method of forming a titanium silicide layer over a substrate comprising TiCl_4 and one silane comprising, providing a substrate in the vapor deposition chamber, feeding TiCl_4 to the chamber without any silane for a first period of time, including plasma generation, and then second feeding of TiCl_4 and at least one silane for a time to deposit titanium silicide layer on a silicon surface (Column 3-Column 4).

5. Claims 1, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5976976 by Doan et al., hereafter Doan.

Doan teaches a method of forming a titanium silicide layer over a substrate comprising TiCl_4 and one silane comprising, providing a substrate in the vapor deposition chamber, feeding TiCl_4 to the chamber without any silane for a first period of time, without or without plasma generation, and then second feeding of TiCl_4 and at

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least one silane for a time to deposit titanium silicide layer on a silicon surface using plasma CVD (Column 2, lines 25-50, Column 4, lines 7-14, Column 5, line 25-Column 6, line 29).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 2-4, 6-9 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandhu.

Claims 2-4: Sandhu does not explicitly disclose that the pressure and temperature of the chamber are the same during the 1st and 2nd feedings or if the TiCl₄ flow rate is constant or different during the 1st and 2nd feedings. However, the

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conditions specified for temperature, pressure, and flow rate taught by Sandhu during the Ti layer deposition and titanium silicide layer deposition show that using the same pressure and temperature and either the same or different titanium flows to be operable for these steps, it would have been obvious to have used the pressures, temperatures, and flow rates as claimed with a reasonable expectation of their being suitable for depositing the desired layers.

Claims 6 and 9: Sandhu does not explicitly disclose the feeding time for the titanium layer deposition and titanium silicide deposition. However, because the disclosed thicknesses for the titanium silicide layer are larger than the titanium layer (see Figure 3), it would have been obvious to deposit the titanium layer for less time than the titanium silicide layer to provide the desired thicknesses. Likewise, the claimed times for depositing the first layer would have been obviously achieved through routine experimentation based on the achieved deposition rates so as to achieve the desired thicknesses.

Claims 7-8: Sandhu fails to explicitly state supplying TiCl_4 for no greater than 3 or 5 seconds, however it is the examiners position that the time for supplying a cleaning agent is a result effective variable. If the time were too low it would result in not enough cleanings and too much time would result in no added benefits of increased cleaning.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the time used in the process of Sandhu, through routine experimentation, to effectively clean the PECVD chamber to the desired properties.

Claims 41 and 42: Sandhu fails to teach of using separate injector ports or mixing the gases prior to feeding for the second feeding. However, it would have been obvious to one skilled in the art at the time of the invention to feed the gases from the same or separate injector ports during the second feeding with the reasonable expectation of providing the reactant material to the chemical vapor deposition chamber prior to plasma enhanced deposition.

8. Claims 2-4, 6-9, 41-42, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doan.

Claims 2-4: Doan does not explicitly disclose that the pressure and temperature of the chamber are the same during the 1st and 2nd feedings or if the TiCl₄ flow rate is constant or different during the 1st and 2nd feedings. However, the conditions specified for temperature, pressure, and flow rate taught by Doan during the Ti layer deposition and titanium silicide layer deposition show that using the same pressure and temperature and either the same or different titanium flows to be operable for these steps, it would have been obvious to have used the pressures, temperatures, and flow rates as claimed with a reasonable expectation of their being suitable for depositing the desired layers.

Claims 6 and 9: Doan does not explicitly disclose the feeding time for the titanium layer deposition and titanium silicide deposition. However, because the disclosed thicknesses for the titanium silicide layer are larger than the titanium layer, it would have been obvious to deposit the titanium layer for less time than the titanium

silicide layer to provide the desired thicknesses. Likewise, the claimed times for depositing the first layer would have been obviously achieved through routine experimentation based on the achieved deposition rates so as to achieve the desired thicknesses.

Claims 7-8: Doan fails to explicitly state supplying TiCl_4 for no greater than 3 or 5 seconds, however it is the examiners position that the time for supplying a cleaning agent is a result effective variable. If the time were too low it would result in not enough cleanings and too much time would result in no added benefits of increased cleaning.

Therefore it would have been obvious to one skill in the art at the time of the invention was made to determine the optimal value for the time used in the process of Doan, through routine experimentation, to effectively clean the PECVD chamber to the desired properties.

Claims 41 and 42: Doan fails to teach of using separate injector ports or mixing the gases prior to feeding for the second feeding. However, it would have been obvious to one skilled in the art at the time of the invention to feed the gases from the same or separate injector ports during the second feeding with the reasonable expectation of providing the reactant material to the chemical vapor deposition chamber prior to plasma enhanced deposition.

Claim 54: Doan fails to teach of continuing plasma generation from the first feeding through the second feeding, however, Doan discloses plasma chemical vapor deposition for both the first feeding and the second feeding and both feedings take place one after the other and therefore it would have been obvious to one of ordinary

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skill in the art to maintain plasma generation from the first feeding to the second feeding with a reasonable expectation of success.

Allowable Subject Matter

9. Claim 5 is allowed.

10. Claim 47 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art alone or in combination cited or reviewed by the examiner suggests a first feeding of only TiCl_4 followed by the second feeding of TiCl_4 and SiH_4 with the substrate in the process chamber during the first and second feedings.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

David Turocy
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TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER